ANNEX A

Methodology for Estimating Emissions of CO_2 from Fossil Fuel Combustion

Carbon dioxide (CO_2) emissions from fossil fuel combustion were estimated using a "bottom-up" methodology characterized by six steps. These steps are described below.

Step 1: Determine Energy Consumption by Fuel Type and Sector

The bottom-up methodology used by the United States for estimating CO_2 emissions from fossil fuel combustion is conceptually similar to the approach recommended by the Intergovernmental Panel on Climate Change (IPCC) for countries that intend to develop detailed, sectoral-based emission estimates (IPCC/UNEP/OECD/IEA 1997). Basic consumption data are presented in Columns 2 through 8 of Table A-1 through Table A-10, with totals by fuel type in Column 8 and totals by end-use sector in the last rows. Fuel consumption data for the bottom-up approach were obtained directly from the Energy Information Administration (EIA) of the U.S. Department of Energy. These data were first gathered in physical units, and then converted to their energy equivalents (see "Converting Physical Units to Energy Units" in Annex T). The EIA data were collected through a variety of consumption surveys at the point of delivery or use and qualified with survey data on fuel production, imports, exports, and stock changes. Individual data elements were supplied by a variety of sources within EIA. Most information was taken from published reports, although some data were drawn from unpublished energy studies and databases maintained by EIA.

Energy consumption data were aggregated by end-use sector (i.e., residential, commercial, industrial, transportation, electric utilities, and U.S. territories), primary fuel type (e.g., coal, natural gas, and petroleum), and secondary fuel type (e.g., motor gasoline, distillate fuel, etc.). The 1999 total energy consumption across all sectors, including territories, and energy types was 82,100 trillion British thermal units (TBtu), as indicated in the last entry of Column 8 in Table A-1. This total includes fuel used for non-energy purposes and fuel consumed as international bunkers, both of which are deducted in later steps.

There are two modifications made in this report that may cause consumption information herein to differ from figures given in the cited literature. These are the consideration of synthetic natural gas production and ethanol added to motor gasoline.

First, a portion of industrial coal accounted for in EIA combustion figures is actually used to make "synthetic natural gas" via coal gasification. The energy in this gas enters the natural gas stream, and is accounted for in natural gas consumption statistics. Because this energy is already accounted for as natural gas, it is deducted from industrial coal consumption to avoid double counting. This makes the figure for other industrial coal consumption in this report slightly lower than most EIA sources.

Second, ethanol has been added to the motor gasoline stream for several years, but prior to 1993 this addition was not captured in EIA motor gasoline statistics. Starting in 1993, ethanol was included in gasoline statistics. However, because ethanol is a biofuel, which is assumed to result in no net CO_2 emissions, the amount of ethanol added is subtracted from total gasoline consumption. Thus, motor gasoline consumption statistics given in this report may be slightly lower than in EIA sources.

There are also three basic differences between the consumption figures presented in Table A-1 through Table A-10 and those recommended in the IPCC emission inventory methodology.

First, consumption data in the U.S. inventory are presented using higher heating values (HHV)[1] rather than the lower heating values (LHV)[2] reflected in the IPCC emission inventory methodology. This convention is followed because data obtained from EIA are based on HHV. Of note, however, is that EIA renewable energy statistics are often published using LHV. The difference between the two conventions relates to the treatment of the

[1] Also referred to as Gross Calorific Values (GCV).

[2] Also referred to as Net Calorific Values (NCV).

heat energy that is consumed in the process of evaporating the water contained in the fuel. The simplified convention used by the International Energy Agency for converting from HHV to LHV is to reduce the energy content by 5 percent for petroleum and coal and by 10 percent for natural gas.

Second, while EIA's energy use data for the United States includes only the 50 U.S. states and the District of Columbia, the data reported to the Framework Convention on Climate Change are to include energy consumption within territories. Therefore, consumption estimates for U.S. territories were added to domestic consumption of fossil fuels. Energy consumption data from U.S. territories are presented in Column 7 of Table A-1. It is reported separately from domestic sectoral consumption, because it is collected separately by EIA with no sectoral disaggregation.

Third, the domestic sectoral consumption data in Table A-1 include bunker fuels used for international transport activities and non-energy uses of fossil fuels. The IPCC requires countries to estimate emissions from international bunker fuels separately and exclude these emissions from national totals, so international bunker fuel emissions have been estimated in Table A-11 and deducted from national estimates (see Step 4). Similarly, fossil fuels used to produce non-energy products that store carbon rather than release it to the atmosphere are provided in Table A-12 and deducted from national emission estimates (see Step 3). The final fate of these fossil fuel based products is dealt with under the waste combustion source category in cases where the products are combusted through waste management practices.

Step 2: Determine the Carbon Content of All Fuels

The carbon content of combusted fossil fuels was estimated by multiplying energy consumption (Columns 2 through 8 of Table A-1) by fuel-specific carbon content coefficients (see Table A-13 and Table A-14) that reflect the amount of carbon per unit of energy in each fuel. The resulting carbon contents are sometimes referred to as potential emissions, or the maximum amount of carbon that could potentially be released to the atmosphere if all carbon in the fuels were oxidized. The carbon content coefficients used in the U.S. inventory were derived by EIA from detailed fuel information and are similar to the carbon content coefficients contained in the IPCC's default methodology (IPCC/UNEP/OECD/IEA 1997), with modifications reflecting fuel qualities specific to the United States.

Step 3: Adjust for the amount of Carbon Stored in Products

Depending on the end-use, non-energy uses of fossil fuels can result in long term storage of some or all of the carbon contained in the fuel. For example, asphalt made from petroleum can sequester up to 100 percent of the carbon contained in the petroleum feedstock for extended periods of time. Other non-energy fossil fuel products, such as lubricants or plastics also store carbon, but can lose or emit some of this carbon when they are used and/or burned as waste.[3]

The amount of carbon in non-energy fossil fuel products was based upon data that addressed the fraction of carbon that remains in products after they are manufactured, with all non-energy use attributed to the industrial, transportation, and territories end-use sectors. This non-energy consumption is presented in Table A-12. This data was then multiplied by fuel-specific carbon content coefficients (Table A-13 and Table A-14) to obtain the carbon content of the fuel, or the maximum amount of carbon that could remain in non-energy products (Columns 5 and 6 of Table A-12). This carbon content was then multiplied by the fraction of carbon assumed to actually have remained in products (Column 7 of Table A-12), resulting in the final estimates by sector and fuel type, which are presented in Columns 8 through 10 of Table A-12. A detailed discussion of carbon stored in products is provided in the Energy Chapter and in Annex B.

Step 4: Subtract Carbon from International Bunker Fuels

Emissions from international transport activities, or international bunker fuel consumption, were not included in national totals, as required by the IPCC (IPCC/UNEP/OECD/IEA 1997). There is currently

[3] See Waste Combustion section of the Waste chapter for a discussion of emissions from the combustion of plastics in the municipal solid waste stream.

disagreement internationally as to how these emissions should be allocated, and until this issue is resolved, countries are asked to report them separately. EIA energy statistics, however, include these bunker fuels—jet fuel for aircraft, and distillate fuel oil and residual fuel oil for marine shipping—as part of fuel consumption by the transportation sector. To compensate for this inclusion, international bunker fuel emissions[4] were calculated separately (see Table A-11) and the carbon content of these fuels was subtracted from the transportation sector. International bunker fuel emissions from military activities were developed using data provided by the Department of Defense as described in the International Bunker Fuels section of the Energy chapter and in Annex H. The calculations of international bunker fuel emissions followed the same procedures used for other fuel emissions (i.e., estimation of consumption, determination of carbon content, and adjustment for the fraction of carbon not oxidized).

Step 5: Account for Carbon that Does Not Oxidize During Combustion

Because combustion processes are not 100 percent efficient, some of the carbon contained in fuels is not emitted in a gaseous form to the atmosphere. Rather, it remains behind as soot, particulate matter and ash. The estimated fraction of carbon not oxidized in U.S. energy conversion processes due to inefficiencies during combustion ranges from 0.5 percent for natural gas to 1 percent for petroleum and coal. Except for coal these assumptions are consistent with the default values recommended by the IPCC (IPCC/UNEP/OECD/IEA 1997). In the United States, unoxidized carbon from coal combustion was estimated to be no more than one percent (Bechtel 1993). Table A-13 presents fractions oxidized by fuel type, which are multiplied by the net carbon content of the combusted energy to give final emissions estimates.

Of the fraction of carbon that is oxidized (e.g., 99 to 99.5 percent), the vast majority is emitted in its fully oxidized form as carbon dioxide (CO_2). A much smaller portion of this "oxidized" carbon is also emitted as carbon monoxide (CO), methane (CH_4), and non-methane volitile organic compounds (NMVOCs). These partially oxidized or unoxidized carbon compounds when in the atmosphere, though, are generally oxidized to CO_2 through atmospheric processes (e.g., reaction with hydroxyl (OH)).

Step 6: Summarize Emission Estimates

Actual CO_2 emissions in the United States were summarized by major fuel (i.e., coal, petroleum, natural gas, geothermal) and consuming sector (i.e., residential, commercial, industrial, transportation, electric utilities, and territories). Adjustments for international bunker fuels and carbon in non-energy products were made. Emission estimates are expressed in teragrams of carbon dioxide equivalents (Tg. CO_2 Eq.).

To determine total emissions by final end-use sector, emissions from electric utilities were distributed to each end-use sector according to its share of aggregate electricity consumption (see Table A-15). This pro-rated approach to allocating emissions from electric utilities may overestimate or underestimate emissions for particular sectors due to differences in the average carbon content of utility fuel mixes.

[4] Refer to the International Bunker Fuels section of the Energy chapter for a description of the methodology for distinguishing between bunker and non-bunker fuel consumption.

Table A-1: 1999 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**44.3**	**66.4**	**3,126.4**	**NE**	**18,310.7**	**10.2**	**21,557.9**	**4.2**	**6.3**	**289.4**	**NE**	**1,711.9**	**0.9**	**2,012.8**
Residential Coal	44.3						44.3	4.2						4.2
Commercial Coal		66.4					66.4		6.3					6.3
Industrial Coking Coal			753.3				753.3			68.2				68.2
Industrial Other Coal			2,315.4				2,315.4			215.4				215.4
Coke Imports			57.7				57.7			5.8				5.8
Transportation Coal				NE			NE							NE
Utility Coal					18,310.7		18,310.7					1,711.9		1,711.9
US Territory Coal (bit)						10.2	10.2						0.9	0.9
Natural Gas	**4,829.7**	**3,152.7**	**10,197.5**	**659.7**	**3,181.9**	**NA**	**22,021.5**	**255.0**	**166.4**	**520.5**	**34.8**	**168.0**		**1,144.7**
Total Petroleum	**1,382.9**	**700.7**	**9,557.4**	**25,196.9**	**942.7**	**740.3**	**38,520.9**	**95.0**	**50.3**	**345.6**	**1,679.2**	**73.4**	**52.1**	**2,295.6**
Asphalt & Road Oil			1,324.4				1,324.4							
Aviation Gasoline				39.2			39.2				2.7			2.7
Distillate Fuel Oil	808.7	437.8	1,153.5	5,069.1	125.4	129.2	7,723.7	58.6	31.7	83.3	358.9	9.1	9.4	550.9
Jet Fuel				3,461.8		75.8	3,537.6				182.0		5.3	187.3
Kerosene	101.2	29.1	20.6			6.9	157.8	7.2	2.1	1.5			0.5	11.3
LPG	473.0	83.5	2,324.8	15.8		8.2	2,905.2	29.2	5.1	43.2	1.0		0.5	78.9
Lubricants			192.8	182.1		1.4	376.3			12.9	12.1		0.1	25.1
Motor Gasoline		44.7	203.7	15,607.6		190.0	16,046.0		3.1	14.3	1,096.6		13.4	1,127.4
Residual Fuel		105.5	209.2	821.3	768.9	102.8	2,007.8		8.2	14.4	25.9	59.4	8.0	115.9
Other Petroleum						226.0	226.0						14.9	14.9
AvGas Blend Components			6.4				6.4			0.4				0.4
Crude Oil														
MoGas Blend Components														
Misc. Products			111.9				111.9							
Naphtha (< 401 deg. F)			502.1				502.1			3.1				3.1
Other Oil (> 401 deg. F)			811.1				811.1			5.6				5.6
Pentanes Plus			365.0				365.0			4.3				4.3
Petroleum Coke			999.9		48.4		1,048.4			82.0		4.9		86.9
Still Gas			1,437.1				1,437.1			91.3				91.3
Special Naphtha			145.4				145.4			10.5				10.5
Unfinished Oils			(287.9)				(287.9)			(21.1)				(21.1)
Waxes			37.4				37.4							
Geothermal					**5.8**		**5.8**					**+**		**+**
TOTAL (All Fuels)	**6,256.8**	**3,919.8**	**22,881.3**	**25,856.6**	**22,435.3**	**750.5**	**82,100.3**	**354.1**	**223.0**	**1,155.6**	**1,714.0**	**1,953.4**	**53.0**	**5,453.1**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

\+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-2: 1998 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**44.3**	**66.4**	**2,811.9**	**NE**	**18,653.6**	**9.8**	**21,586.0**	**4.2**	**6.3**	**260.2**	**NE**	**1,744.0**	**0.9**	**2,015.6**
Residential Coal	44.3						44.3	4.2						4.2
Commercial Coal		66.4					66.4		6.3					6.3
Industrial Coking Coal			755.5				755.5			68.3				68.3
Industrial Other Coal			1,989.4				1,989.4			185.1				185.1
Coke Imports			67.1				67.1			6.8				6.8
Transportation Coal				NE			NE							NE
Utility Coal					18,653.6		18,653.6					1,744.0		1,744.0
US Territory Coal (bit)						9.8	9.8						0.9	0.9
Natural Gas	**4,669.4**	**3,098.5**	**10,152.1**	**661.7**	**3,329.7**	**NA**	**21,911.4**	**246.5**	**163.6**	**519.0**	**34.9**	**175.8**		**1,139.8**
Total Petroleum	**1,310.6**	**662.3**	**9,151.8**	**24,469.9**	**1,166.1**	**668.3**	**37,429.0**	**90.3**	**47.6**	**334.1**	**1,621.6**	**90.8**	**47.0**	**2,231.3**
Asphalt & Road Oil			1,262.6				1,262.6							
Aviation Gasoline				35.5			35.5				2.4			2.4
Distillate Fuel Oil	781.9	422.5	1,144.8	4,881.8	128.4	116.6	7,476.0	56.6	30.6	82.7	342.2	9.3	8.4	529.8
Jet Fuel				3,356.8		68.0	3,424.8				180.6		4.8	185.3
Kerosene	108.3	31.2	22.1			6.3	167.8	7.8	2.2	1.6			0.4	12.0
LPG	420.4	74.2	2,066.4	14.1		7.2	2,582.2	25.9	4.6	38.7	0.9		0.4	70.5
Lubricants			190.8	180.2		1.3	372.3			12.7	12.0		0.1	24.8
Motor Gasoline		43.8	199.4	15,285.1		170.0	15,698.4		3.1	14.0	1,074.0		11.9	1,103.1
Residual Fuel		90.7	244.3	716.4	984.4	91.9	2,127.6		7.1	17.1	9.5	76.1	7.2	116.9
Other Petroleum						207.1	207.1						13.7	13.7
AvGas Blend Components			4.0				4.0			0.3				0.3
Crude Oil														
MoGas Blend Components														
Misc. Products			119.0				119.0							
Naphtha (< 401 deg. F)			584.0				584.0			3.6				3.6
Other Oil (> 401 deg. F)			818.7				818.7			5.6				5.6
Pentanes Plus			294.0				294.0			3.5				3.5
Petroleum Coke			928.9		53.3		982.2			78.3		5.4		83.7
Still Gas			1,437.2				1,437.2			91.4				91.4
Special Naphtha			107.3				107.3			7.7				7.7
Unfinished Oils			(313.9)				(313.9)			(23.1)				(23.1)
Waxes			42.4				42.4							
Geothermal					**17.7**		**17.7**					**0.1**		**0.1**
TOTAL (All Fuels)	**6,024.3**	**3,827.2**	**22,115.9**	**25,131.6**	**23,149.4**	**678.1**	**80,926.5**	**341.0**	**217.4**	**1,113.3**	**1,656.5**	**2,010.7**	**47.9**	**5,386.8**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-3: 1997 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**57.8**	**86.8**	**2,827.4**	**NE**	**18,500.6**	**10.4**	**21,483.1**	**5.5**	**8.2**	**261.3**	**NE**	**1,729.7**	**1.0**	**2,005.6**
Residential Coal	57.8						57.8	5.5						5.5
Commercial Coal		86.8					86.8		8.2					8.2
Industrial Coking Coal			849.7				849.7			76.9				76.9
Industrial Other Coal			1,931.3				1,931.3			179.7				179.7
Coke Imports			46.4				46.4			4.7				4.7
Transportation Coal				NE			NE							NE
Utility Coal					18,500.6		18,500.6					1,729.7		1,729.7
US Territory Coal (bit)						10.4	10.4						1.0	1.0
Natural Gas	**5,124.6**	**3,309.7**	**10,432.0**	**785.7**	**3,023.0**	**NA**	**22,674.9**	**270.5**	**174.7**	**533.5**	**41.5**	**159.6**		**1,179.8**
Total Petroleum	**1,431.9**	**705.2**	**9,315.1**	**23,950.5**	**822.0**	**598.5**	**36,823.2**	**98.9**	**50.8**	**346.4**	**1,587.4**	**64.1**	**41.8**	**2,189.4**
Asphalt & Road Oil			1,223.6				1,223.6							
Aviation Gasoline				39.7			39.7				2.7			2.7
Distillate Fuel Oil	900.0	446.5	1,135.5	4,733.9	88.3	107.1	7,411.3	65.2	32.3	82.0	333.8	6.4	7.8	527.4
Jet Fuel				3,308.2		64.0	3,372.1				176.2		4.5	180.7
Kerosene	92.9	24.6	18.8			4.0	140.3	6.6	1.8	1.3			0.3	10.0
LPG	439.1	77.5	2,159.6	13.4		7.9	2,697.5	27.1	4.8	40.6	0.8		0.5	73.7
Lubricants			182.3	172.1		2.5	356.9			12.2	11.5		0.2	23.8
Motor Gasoline		43.1	213.5	14,956.7		143.6	15,356.8		3.0	15.0	1,050.6		10.1	1,078.7
Residual Fuel		113.6	296.7	726.5	691.5	60.0	1,888.2		8.9	21.2	11.8	53.4	4.7	100.0
Other Petroleum						209.4	209.4						13.9	13.9
AvGas Blend Components			9.1				9.1			0.6				0.6
Crude Oil			4.6				4.6			0.3				0.3
MoGas Blend Components														
Misc. Products			97.7				97.7							
Naphtha (< 401 deg. F)			536.4				536.4			3.3				3.3
Other Oil (> 401 deg. F)			861.2				861.2			5.9				5.9
Pentanes Plus			328.9				328.9			3.9				3.9
Petroleum Coke			786.9		42.2		829.1			70.6		4.3		74.9
Still Gas			1,447.1				1,447.1			91.9				91.9
Special Naphtha			72.3				72.3			5.2				5.2
Unfinished Oils			(102.9)				(102.9)			(7.6)				(7.6)
Waxes			43.7				43.7							
Geothermal					**18.7**		**18.7**					**0.1**		**0.1**
TOTAL (All Fuels)	**6,614.4**	**4,101.7**	**22,574.5**	**24,736.2**	**22,345.6**	**608.9**	**80,981.2**	**374.9**	**233.7**	**1,141.1**	**1,628.9**	**1,953.5**	**42.8**	**5,374.9**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-4: 1996 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**54.5**	**81.9**	**2,811.6**	**NE**	**17,952.8**	**10.3**	**20,911.2**	**5.1**	**7.7**	**259.3**	**NE**	**1,677.7**	**0.9**	**1,950.8**
Residential Coal	54.5						54.5	5.1						5.1
Commercial Coal		81.9					81.9		7.7					7.7
Industrial Coking Coal			849.7				849.7			76.8				76.8
Industrial Other Coal			1,939.1				1,939.1			180.2				180.2
Coke Imports			22.8				22.8			2.3				2.3
Transportation Coal				NE			NE							NE
Utility Coal					17,952.8		17,952.8					1,677.7		1,677.7
US Territory Coal (bit)						10.3	10.3						0.9	0.9
Natural Gas	**5,390.2**	**3,250.4**	**10,428.4**	**737.1**	**2,774.3**	**NA**	**22,580.3**	**284.6**	**171.6**	**534.0**	**38.9**	**146.5**		**1,175.5**
Total Petroleum	**1,457.3**	**740.7**	**9,102.8**	**23,716.8**	**724.9**	**560.0**	**36,302.4**	**100.7**	**53.5**	**347.2**	**1,579.8**	**56.0**	**39.1**	**2,176.5**
Asphalt & Road Oil			1,175.9				1,175.9							
Aviation Gasoline				37.4			37.4				2.6			2.6
Distillate Fuel Oil	929.8	476.0	1,127.1	4,543.2	98.4	106.3	7,280.8	67.3	34.5	81.4	320.8	7.1	7.7	518.8
Jet Fuel				3,274.2		66.1	3,340.3				177.6		4.6	182.3
Kerosene	88.8	21.0	18.3			3.0	131.1	6.4	1.5	1.3			0.2	9.4
LPG	438.7	77.4	2,129.5	14.7		7.3	2,667.7	27.1	4.8	39.8	0.9		0.5	73.0
Lubricants			172.5	163.0		0.8	336.3			11.5	10.9		0.1	22.4
Motor Gasoline		26.7	201.3	14,818.6		118.6	15,165.3		1.9	14.1	1,041.4		8.3	1,065.8
Residual Fuel		139.5	340.9	865.7	606.0	57.2	2,009.3		10.9	24.6	25.7	46.8	4.5	112.5
Other Petroleum						200.7	200.7						13.3	13.3
AvGas Blend Components			7.0				7.0			0.5				0.5
Crude Oil			13.7				13.7			1.0				1.0
MoGas Blend Components														
Misc. Products			89.0				89.0							
Naphtha (<401 deg. F)			479.3				479.3			3.0				3.0
Other Oil (>401 deg. F)			729.6				729.6			5.0				5.0
Pentanes Plus			355.0				355.0			4.5				4.5
Petroleum Coke			816.0		20.5		836.5			72.0		2.1		74.1
Still Gas			1,437.1				1,437.1			91.3				91.3
Special Naphtha			74.5				74.5			5.4				5.4
Unfinished Oils			(112.8)				(112.8)			(8.3)				(8.3)
Waxes			48.7				48.7							
Geothermal					**17.9**		**17.9**					**0.1**		**0.1**
TOTAL (All Fuels)	**6,902.0**	**4,073.0**	**22,342.9**	**24,453.8**	**21,451.9**	**570.3**	**79,793.9**	**390.4**	**232.8**	**1,140.6**	**1,618.8**	**1,880.3**	**40.1**	**5,303.0**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

\+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-5: 1995 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**53.3**	**80.4**	**2,886.0**	**NE**	**16,990.5**	**10.2**	**20,020.4**	**5.0**	**7.6**	**266.6**	**NE**	**1,587.7**	**0.9**	**1,867.9**
Residential Coal	53.3						53.3	5.0						5.0
Commercial Coal		80.4					80.4		7.6					7.6
Industrial Coking Coal			884.7				884.7			79.9				79.9
Industrial Other Coal			1,940.2				1,940.2			180.5				180.5
Coke Imports			61.1				61.1			6.2				6.2
Transportation Coal				NE			NE							NE
Utility Coal					16,990.5		16,990.5					1,587.7		1,587.7
US Territory Coal (bit)						10.2	10.2						0.9	0.9
Natural Gas	**4,984.4**	**3,116.9**	**10,089.7**	**725.8**	**3,253.4**	**NA**	**22,170.2**	**263.1**	**164.5**	**516.2**	**38.3**	**171.8**		**1,154.0**
Total Petroleum	**1,361.1**	**715.2**	**8,624.4**	**23,133.1**	**658.0**	**605.5**	**35,097.2**	**94.2**	**51.8**	**318.2**	**1,541.1**	**51.0**	**43.1**	**2,099.2**
Asphalt & Road Oil			1,178.2				1,178.2							
Aviation Gasoline				39.6			39.6				2.7			2.7
Distillate Fuel Oil	882.6	459.8	1,074.2	4,310.5	90.7	125.6	6,943.3	63.9	33.3	77.5	303.1	6.6	9.1	493.5
Jet Fuel				3,132.2		75.5	3,207.7				168.8		5.3	174.1
Kerosene	74.3	22.1	15.4			3.6	115.4	5.3	1.6	1.1			0.3	8.3
LPG	404.2	71.3	2,019.4	16.7		5.6	2,517.4	24.9	4.4	36.6	1.0		0.3	67.3
Lubricants			177.8	167.9		2.0	347.7			11.9	11.2		0.1	23.2
Motor Gasoline		18.2	201.6	14,541.5		148.1	14,909.5		1.3	14.2	1,023.0		10.4	1,048.9
Residual Fuel		143.7	342.0	924.7	544.4	111.9	2,066.6		11.2	24.7	31.3	42.1	8.7	118.0
Other Petroleum						133.2	133.2						8.8	8.8
AvGas Blend Components			5.3				5.3			0.4				0.4
Crude Oil			14.5				14.5			1.1				1.1
MoGas Blend Components														
Misc. Products			97.1				97.1							
Naphtha (<401 deg. F)			373.0				373.0			2.3				2.3
Other Oil (>401 deg. F)			801.0				801.0			5.5				5.5
Pentanes Plus			337.9				337.9			4.2				4.2
Petroleum Coke			779.0		22.9		802.0			69.1		2.3		71.5
Still Gas			1,417.5				1,417.5			88.1				88.1
Special Naphtha			70.8				70.8			5.1				5.1
Unfinished Oils			(320.9)				(320.9)			(23.6)				(23.6)
Waxes			40.6				40.6							
Geothermal					**16.2**		**16.2**					**0.1**		**0.1**
TOTAL (All Fuels)	**6,398.8**	**3,912.5**	**21,600.1**	**23,858.9**	**20,901.8**	**615.7**	**77,287.8**	**362.3**	**223.9**	**1,101.0**	**1,579.4**	**1,810.6**	**44.0**	**5,121.3**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-6: 1994 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**55.1**	**82.7**	**2,878.3**	**NE**	**16,895.4**	**10.0**	**19,921.6**	**5.2**	**7.8**	**266.0**	**NE**	**1,577.3**	**0.9**	**1,857.2**
Residential Coal	55.1						55.1	5.2						5.2
Commercial Coal		82.7					82.7		7.8					7.8
Industrial Coking Coal			850.6				850.6			76.8				76.8
Industrial Other Coal			1,969.4				1,969.4			183.2				183.2
Coke Imports			58.3				58.3			5.9				5.9
Transportation Coal				NE			NE							NE
Utility Coal					16,895.4		16,895.4					1,577.3		1,577.3
US Territory Coal (bit)						10.0	10.0						0.9	0.9
Natural Gas	**4,980.3**	**2,977.6**	**9,565.3**	**708.0**	**3,057.0**	**NA**	**21,288.2**	**262.9**	**157.2**	**488.0**	**37.4**	**161.4**		**1,106.9**
Total Petroleum	**1,340.3**	**753.5**	**8,849.4**	**22,661.6**	**968.2**	**561.8**	**35,134.8**	**92.8**	**54.7**	**336.9**	**1,514.0**	**75.0**	**40.8**	**2,114.1**
Asphalt & Road Oil			1,172.9				1,172.9							
Aviation Gasoline				38.1			38.1				2.6			2.6
Distillate Fuel Oil	880.0	464.3	1,108.8	4,175.0	95.2	118.8	6,842.1	63.7	33.6	80.1	293.6	6.9	8.6	486.5
Jet Fuel				3,154.5		65.8	3,220.3				173.2		4.6	177.8
Kerosene	64.9	19.5	16.9			3.0	104.3	4.6	1.4	1.2			0.2	7.5
LPG	395.4	69.8	1,996.5	32.2		7.3	2,501.2	24.4	4.3	37.5	2.0		0.4	68.7
Lubricants			180.9	170.8		1.9	353.6			12.1	11.4		0.1	23.6
Motor Gasoline		25.3	193.3	14,194.9		148.0	14,561.5		1.8	13.6	1,002.2		10.4	1,028.1
Residual Fuel		174.6	425.3	896.0	846.6	164.1	2,506.5		13.6	31.2	29.0	65.4	12.8	152.0
Other Petroleum						53.0	53.0						3.5	3.5
AvGas Blend Components			6.1				6.1			0.4				0.4
Crude Oil			18.7				18.7			1.4				1.4
MoGas Blend Components														
Misc. Products			105.9				105.9							
Naphtha (< 401 deg. F)			398.3				398.3			2.5				2.5
Other Oil (> 401 deg. F)			838.6				838.6			5.8				5.8
Pentanes Plus			338.7				338.7			7.0				7.0
Petroleum Coke			766.7		26.3		793.0			68.4		2.7		71.1
Still Gas			1,439.4				1,439.4			90.4				90.4
Special Naphtha			81.1				81.1			5.8				5.8
Unfinished Oils			(279.2)				(279.2)			(20.5)				(20.5)
Waxes			40.6				40.6							
Geothermal					**23.7**		**23.7**					**0.2**		**0.2**
TOTAL (All Fuels)	**6,375.7**	**3,813.7**	**21,293.1**	**23,369.6**	**20,920.5**	**571.8**	**76,344.5**	**360.9**	**219.7**	**1,090.9**	**1,551.4**	**1,813.9**	**41.7**	**5,078.4**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

\+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-7: 1993 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**56.6**	**85.5**	**2,776.8**	**NE**	**16,790.0**	**9.6**	**19,718.5**	**5.3**	**8.1**	**256.0**	**NE**	**1,566.7**	**0.9**	**1,837.0**
Residential Coal	56.6						56.6	5.3						5.3
Commercial Coal		85.5					85.5		8.1					8.1
Industrial Coking Coal			839.5				839.5			75.7				75.7
Industrial Other Coal			1,910.3				1,910.3			177.6				177.6
Coke Imports			27.1				27.1			2.7				2.7
Transportation Coal				NE			NE							NE
Utility Coal					16,790.0		16,790.0					1,566.7		1,566.7
US Territory Coal (bit)						9.6	9.6						0.9	0.9
Natural Gas	**5,097.5**	**2,943.7**	**9,360.5**	**644.1**	**2,744.1**	**NA**	**20,789.9**	**269.1**	**155.4**	**480.6**	**34.0**	**144.9**		**1,084.0**
Total Petroleum	**1,387.0**	**752.8**	**8,449.6**	**22,056.6**	**1,052.0**	**534.1**	**34,232.2**	**96.1**	**54.7**	**325.8**	**1,468.5**	**81.8**	**38.7**	**2,065.5**
Asphalt & Road Oil			1,149.0				1,149.0							
Aviation Gasoline				38.4			38.4				2.6			2.6
Distillate Fuel Oil	912.9	463.9	1,099.7	3,912.9	76.7	104.9	6,570.9	66.1	33.6	79.4	272.7	5.6	7.6	465.0
Jet Fuel				3,028.0		62.1	3,090.1				165.3		4.4	169.7
Kerosene	75.6	14.0	13.1			3.8	106.5	5.4	1.0	0.9			0.3	7.6
LPG	398.6	70.3	1,794.4	19.0		4.9	2,287.3	24.6	4.3	36.0	1.2		0.3	66.3
Lubricants			173.1	163.5		3.3	339.8			11.5	10.9		0.2	22.7
Motor Gasoline		29.6	179.4	13,981.5		128.2	14,318.7		2.1	12.7	986.1		9.0	1,009.9
Residual Fuel		175.0	451.8	913.4	938.6	155.9	2,634.6		13.7	33.1	29.6	72.5	12.2	161.1
Other Petroleum						71.0	71.0						4.7	4.7
AvGas Blend Components			0.1				0.1			+				+
Crude Oil			21.2				21.2			1.6				1.6
MoGas Blend Components														
Misc. Products			94.7				94.7							
Naphtha (<401 deg. F)			350.6				350.6			2.2				2.2
Other Oil (>401 deg. F)			844.1				844.1			5.8				5.8
Pentanes Plus			332.3				332.3			5.5				5.5
Petroleum Coke			767.3		36.8		804.1			69.2		3.7		72.9
Still Gas			1,430.2				1,430.2			89.5				89.5
Special Naphtha			104.6				104.6			7.5				7.5
Unfinished Oils			(396.0)				(396.0)			(29.1)				(29.1)
Waxes			40.0				40.0							
Geothermal					**25.8**		**25.8**					**0.2**		**0.2**
TOTAL (All Fuels)	**6,541.1**	**3,782.0**	**20,587.0**	**22,700.7**	**20,586.1**	**543.7**	**74,740.6**	**370.5**	**218.1**	**1,062.4**	**1,502.5**	**1,793.6**	**39.5**	**4,986.7**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-8: 1992 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**56.7**	**85.7**	**2,754.0**	**NE**	**16,210.9**	**8.8**	**19,116.1**	**5.4**	**8.1**	**253.3**	**NE**	**1,512.0**	**0.8**	**1,779.6**
Residential Coal	56.7						56.7	5.4						5.4
Commercial Coal		85.7					85.7		8.1					8.1
Industrial Coking Coal			867.4				867.4			77.5				77.5
Industrial Other Coal			1,851.9				1,851.9			172.2				172.2
Coke Imports			34.6				34.6			3.5				3.5
Transportation Coal				NE			NE							NE
Utility Coal					16,210.9		16,210.9					1,512.0		1,512.0
US Territory Coal (bit)						8.8	8.8						0.8	0.8
Natural Gas	**4,821.1**	**2,884.2**	**8,980.5**	**609.0**	**2,828.5**	**NA**	**20,123.3**	**254.5**	**152.3**	**461.7**	**32.1**	**149.3**		**1,049.9**
Total Petroleum	**1,312.4**	**813.5**	**8,635.9**	**21,796.5**	**951.0**	**507.5**	**34,016.7**	**90.9**	**59.1**	**349.9**	**1,440.8**	**73.9**	**36.7**	**2,051.4**
Asphalt & Road Oil			1,102.2				1,102.2							
Aviation Gasoline				41.1			41.1				2.8			2.8
Distillate Fuel Oil	864.9	464.0	1,144.5	3,810.2	67.3	91.8	6,442.6	62.6	33.6	82.6	265.4	4.9	6.6	455.7
Jet Fuel				3,001.3		61.3	3,062.6				164.1		4.3	168.4
Kerosene	65.0	11.1	9.8			3.3	89.2	4.7	0.8	0.7			0.2	6.4
LPG	382.5	67.5	1,859.8	18.4		11.9	2,340.0	23.6	4.2	37.8	1.1		0.7	67.4
Lubricants			170.0	160.5		1.5	332.0			11.3	10.7		0.1	22.1
Motor Gasoline		79.6	194.3	13,683.0		122.1	14,079.0		5.6	13.7	964.6		8.6	992.5
Residual Fuel		191.2	391.3	1,082.0	853.6	154.6	2,672.7		14.9	28.2	32.2	66.0	12.1	153.3
Other Petroleum						61.2	61.2						4.0	4.0
AvGas Blend Components			0.2				0.2			+				+
Crude Oil			27.4				27.4			2.0				2.0
MoGas Blend Components			75.7				75.7			5.3				5.3
Misc. Products			100.1				100.1							
Naphtha (<401 deg. F)			377.1				377.1			2.4				2.4
Other Oil (>401 deg. F)			814.5				814.5			5.6				5.6
Pentanes Plus			322.5				322.5			17.7				17.7
Petroleum Coke			812.7		30.1		842.8			69.7		3.0		72.8
Still Gas			1,447.0				1,447.0			91.4				91.4
Special Naphtha			104.6				104.6			7.5				7.5
Unfinished Oils			(354.8)				(354.8)			(26.0)				(26.0)
Waxes			37.3				37.3							
Geothermal					**27.7**		**27.7**					**0.2**		**0.2**
TOTAL (All Fuels)	**6,190.2**	**3,783.3**	**20,370.4**	**22,405.4**	**19,990.5**	**516.3**	**73,256.1**	**350.8**	**219.5**	**1,064.9**	**1,473.0**	**1,735.4**	**37.5**	**4,881.1**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

\+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-9: 1991 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**56.3**	**84.5**	**2,739.1**	**NE**	**16,028.4**	**7.7**	**18,916.1**	**5.3**	**8.0**	**253.0**	**NE**	**1,495.0**	**0.7**	**1,762.0**
Residential Coal	56.3						56.3	5.3						5.3
Commercial Coal		84.5					84.5		8.0					8.0
Industrial Coking Coal			907.3				907.3			82.7				82.7
Industrial Other Coal			1,822.2				1,822.2			169.3				169.3
Coke Imports			9.7				9.7			1.0				1.0
Transportation Coal				NE			NE							NE
Utility Coal					16,028.4		16,028.4					1,495.0		1,495.0
US Territory Coal (bit)						7.7	7.7						0.7	0.7
Natural Gas	**4,685.0**	**2,807.7**	**8,617.7**	**621.9**	**2,853.6**	**NA**	**19,585.8**	**247.3**	**148.2**	**440.6**	**32.8**	**150.6**		**1,019.6**
Total Petroleum	**1,293.3**	**860.7**	**8,057.8**	**21,443.3**	**1,177.8**	**539.8**	**33,372.7**	**89.4**	**62.6**	**314.1**	**1,404.9**	**91.2**	**38.6**	**2,000.7**
Asphalt & Road Oil			1,076.5				1,076.5							
Aviation Gasoline				41.7			41.7				2.9			2.9
Distillate Fuel Oil	831.5	481.6	1,139.2	3,677.6	80.0	71.4	6,281.3	60.2	34.9	82.2	255.5	5.8	5.2	443.8
Jet Fuel				3,025.0		78.3	3,103.3				166.4		5.5	171.9
Kerosene	72.3	12.1	11.4			2.8	98.6	5.2	0.9	0.8			0.2	7.1
LPG	389.5	68.7	1,749.3	19.9		13.8	2,241.2	24.0	4.2	31.6	1.2		0.8	61.9
Lubricants			166.7	157.5		0.6	324.8			11.1	10.5		+	21.7
Motor Gasoline		85.0	193.3	13,489.7		124.7	13,892.6		6.0	13.6	950.5		8.8	978.9
Residual Fuel		213.2	335.9	1,031.9	1,076.1	134.6	2,791.7		16.6	23.7	18.0	83.2	10.5	152.0
Other Petroleum						113.7	113.7						7.5	7.5
AvGas Blend Components			(0.1)				(0.1)			(+)				(+)
Crude Oil			38.9				38.9			2.9				2.9
MoGas Blend Components			(25.9)				(25.9)			(1.8)				(1.8)
Misc. Products			152.6				152.6							
Naphtha (<401 deg. F)			298.9				298.9			1.9				1.9
Other Oil (>401 deg. F)			827.3				827.3			5.7				5.7
Pentanes Plus			294.0				294.0			16.8				16.8
Petroleum Coke			700.2		21.7		722.0			62.7		2.2		64.9
Still Gas			1,426.6				1,426.6			89.6				89.6
Special Naphtha			88.0				88.0			6.3				6.3
Unfinished Oils			(450.2)				(450.2)			(33.0)				(33.0)
Waxes			35.1				35.1							
Geothermal					**27.6**		**27.6**					**0.2**		**0.2**
TOTAL (All Fuels)	**6,034.6**	**3,752.8**	**19,414.6**	**22,065.2**	**20,059.8**	**547.6**	**71,874.6**	**342.0**	**218.8**	**1,007.6**	**1,437.7**	**1,737.0**	**39.3**	**4,782.4**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-10: 1990 Energy Consumption Data and CO_2 Emissions from Fossil Fuel Combustion by Fuel Type

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Consumption (TBtu)[a]							Emissions (Tg CO_2 Eq.) including Adjustments[b] and Fraction Oxidized						
Fuel Type	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**	**Res.**	**Comm.**	**Ind.**	**Trans.**	**Utility**	**Terr.**	**Total**
Total Coal	**61.9**	**92.9**	**2,725.0**	**NE**	**16,189.6**	**7.0**	**19,076.4**	**5.8**	**8.7**	**251.4**	**NE**	**1,509.3**	**0.6**	**1,775.9**
Residential Coal	61.9						61.9	5.8						5.8
Commercial Coal		92.9					92.9		8.7					8.7
Industrial Coking Coal			1,041.8				1,041.8			95.0				95.0
Industrial Other Coal			1,678.4				1,678.4			155.9				155.9
Coke Imports			4.8				4.8			0.5				0.5
Transportation Coal				NE			NE							NE
Utility Coal					16,189.6		16,189.6					1,509.3		1,509.3
US Territory Coal (bit)						7.0	7.0						0.6	0.6
Natural Gas	**4,518.7**	**2,698.1**	**8,500.4**	**682.4**	**2,861.4**	**NA**	**19,261.0**	**238.5**	**142.4**	**433.8**	**36.0**	**151.1**		**1,001.9**
Total Petroleum	**1,266.3**	**907.5**	**8,319.0**	**21,793.5**	**1,250.4**	**461.5**	**33,998.2**	**87.7**	**66.1**	**338.3**	**1,435.8**	**96.8**	**33.1**	**2,057.8**
Asphalt & Road Oil			1,170.2				1,170.2							
Aviation Gasoline				45.0			45.0				3.1			3.1
Distillate Fuel Oil	837.4	487.0	1,180.9	3,830.5	86.3	74.0	6,496.1	60.6	35.3	85.3	266.0	6.3	5.4	458.7
Jet Fuel				3,129.5		61.0	3,190.5				173.7		4.3	178.0
Kerosene	63.9	11.8	12.3			2.6	90.6	4.6	0.8	0.9			0.2	6.5
LPG	365.0	64.4	1,607.7	21.6		14.4	2,073.1	22.5	4.0	32.7	1.3		0.9	61.4
Lubricants			186.3	176.0		0.7	363.1			12.4	11.7		+	24.2
Motor Gasoline		111.2	185.2	13,560.7		101.0	13,958.1		7.8	13.0	955.5		7.1	983.5
Residual Fuel		233.1	417.2	1,030.2	1,139.4	121.8	2,941.7		18.2	30.7	24.5	88.1	9.5	171.0
Other Petroleum						86.0	86.0						5.7	5.7
AvGas Blend Components			0.2				0.2			+				+
Crude Oil			50.9				50.9			3.7				3.7
MoGas Blend Components			53.7				53.7			3.8				3.8
Misc. Products			137.8				137.8							
Naphtha (< 401 deg. F)			347.8				347.8			2.2				2.2
Other Oil (> 401 deg. F)			753.9				753.9			5.2				5.2
Pentanes Plus			250.3				250.3			11.6				11.6
Petroleum Coke			719.9		24.7		744.6			63.5		2.5		66.0
Still Gas			1,473.2				1,473.2			92.6				92.6
Special Naphtha			107.1				107.1			7.7				7.7
Unfinished Oils			(369.0)				(369.0)			(27.0)				(27.0)
Waxes			33.3				33.3							
Geothermal					**29.3**		**29.3**					**0.2**		**0.2**
TOTAL (All Fuels)	**5,846.9**	**3,698.5**	**19,544.4**	**22,475.9**	**20,301.5**	**468.6**	**72,335.7**	**332.1**	**217.3**	**1,023.5**	**1,471.8**	**1,757.3**	**33.7**	**4,835.7**

[a] Expressed as gross calorific values (i.e., higher heating values).

[b] Adjustments include: international bunker fuel consumption (see Table A-11) and carbon in non-energy products (see Table A-12).

\+ Does not exceed 0.05 Tg CO_2 Eq.

NA (Not Available)

NE (Not Estimated)

Table A-11: 1999 CO_2 Emissions From International Bunker Fuel Consumption

Fuel Type	Bunker Fuel Consumption (TBtu)	Carbon Content Coefficient (Tg Carbon/QBtu)[1]	Potential Emissions (Tg Carbon)	Fraction Oxidized	Emissions (Tg CO_2 Eq.)
Distillate Fuel Oil	113	19.95	2.3	0.99	8.2
Jet Fuel	869	19.33	16.8	0.99	61.6
Residual Fuel Oil	490	21.49	10.5	0.99	38.5
Total	**1,471**		**29.6**		**108.3**

Table A-12: 1999 Carbon In Non-Energy Products

1	*2*	*3*	*4*	*5*	*6*
Fuel Type	**Non-energy Use (TBtu)**	**Carbon Content Coefficient (Tg Carbon/QBtu)**	**Potential Emissions (Tg Carbon)**	**Fraction Sequestered[a]**	**Carbon Stored (Tg CO_2 Eq.)**
Industry	**6,476.9**		**122.2**		**358.8**
Industrial Coking Coal	24.5	25.56	0.6	0.75	1.7
Natural Gas					
Nitrogenous Fertilizers	381.7	14.47	5.5	0.00	0.0
Other Uses	372.6	14.47	5.4	0.91	17.9
Asphalt & Road Oil	1,324.4	20.62	27.3	1.00	100.1
LPG	1,807.1	16.88	30.5	0.91	101.2
Lubricants	192.8	20.24	3.9	0.09	1.3
Pentanes Plus	331.7	18.24	6.0	0.91	20.1
Petrochemical Feedstocks					
Naphtha (<401 deg. F)	502.1	18.14	9.1	0.91	30.2
Other Oil (>401 deg. F)	811.1	19.95	16.2	0.91	53.7
Still Gas	0.0	17.51	0.0	0.80	0.0
Petroleum Coke	376.8	27.85	10.5	0.50	19.2
Special Naphtha	145.4	19.86	2.9	0.00	0.0
Other (Wax/Misc.)					
Distillate Fuel Oil	7.0	19.95	0.1	0.50	0.3
Residual Fuel	50.3	21.49	1.1	0.50	2.0
Waxes	37.4	19.81	0.7	1.00	2.7
Miscellaneous	111.9	20.19	2.3	1.00	8.3
Transportation	**182.1**		**3.7**		**1.2**
Lubricants	182.1	20.24	3.7	0.09	1.2
U.S. Territories	**227.4**		**4.5**		**1.7**
Lubricants	1.4	20.24	0.0	0.09	0.0
Other Petroleum (Misc.)	226.0	20.00	4.5	0.10	1.7
Total	**6,886.4**		**130.4**		**361.7**

[a] See Annex B for additional detail.

[1] One QBtu is one quadrillion Btu, or 10^{15} Btu. This unit is commonly referred to as a "Quad."

Table A-13: Key Assumptions for Estimating Carbon Dioxide Emissions

Fuel Type	Carbon Content Coefficient (Tg Carbon/QBtu)	Fraction Oxidized
Coal		
Residential Coal	[a]	0.99
Commercial Coal	[a]	0.99
Industrial Coking Coal	[a]	0.99
Industrial Other Coal	[a]	0.99
Coke Imports	27.85	0.99
Transportation Coal	NC	0.99
Utility Coal	[a]	0.99
U.S. Territory Coal (bit)	25.14	0.99
Natural Gas	14.47	0.995
Petroleum		
Asphalt & Road Oil	20.62	0.99
Aviation Gasoline	18.87	0.99
Distillate Fuel Oil	19.95	0.99
Jet Fuel	[a]	0.99
Kerosene	19.72	0.99
LPG	[a]	0.99
LPG (Territories)	[a]	0.99
LPG (non-energy use)	[a]	-
Lubricants	20.24	0.99
Motor Gasoline	[a]	0.99
Residual Fuel	21.49	0.99
Other Petroleum	20.23	0.99
AvGas Blend Components	18.87	0.99
Crude Oil	[a]	0.99
MoGas Blend Components	[a]	0.99
Misc. Products	[a]	0.99
Misc. Products (Territories)	20.00	0.99
Naphtha (< 401 deg. F)	18.14	0.99
Other Oil (> 401 deg. F)	19.95	0.99
Pentanes Plus	18.24	0.99
Petrochemical Feedstocks	19.37	0.99
Petroleum Coke	27.85	0.99
Still Gas	17.51	0.99
Special Naphtha	19.86	0.99
Unfinished Oils	[a]	0.99
Waxes	19.81	0.99
Other Wax & Misc.	19.81	0.99
Geothermal	2.05	1.00

Sources: Carbon coefficients and stored carbon from EIA. Combustion efficiency for coal from Bechtel (1993) and for petroleum and natural gas from IPCC (IPCC/UNEP/OECD/IEA 1997, vol. 2).

- Not applicable

NC (Not Calculated)

[a] These coefficients vary annually due to fluctuations in fuel quality (see Table A-14).

Table A-14: Annually Variable Carbon Content Coefficients by Year (Tg Carbon/QBtu)

Fuel Type	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Residential Coal	25.92	26.00	26.13	25.97	25.95	26.00	25.92	26.00	26.00	26.00
Commercial Coal	25.92	26.00	26.13	25.97	25.95	26.00	25.92	26.00	26.00	26.00
Industrial Coking Coal	25.51	25.51	25.51	25.51	25.52	25.53	25.55	25.56	25.56	25.56
Industrial Other Coal	25.58	25.59	25.62	25.61	25.63	25.63	25.61	25.63	25.63	25.63
Utility Coal	25.68	25.69	25.69	25.71	25.72	25.74	25.74	25.76	25.76	25.76
LPG	16.99	16.98	16.99	16.97	17.01	17.00	16.99	16.99	16.99	16.99
LPG (energy use/Territories)	17.13	17.12	17.13	17.13	17.13	17.12	17.11	17.11	17.11	17.11
LPG (non-energy use)	16.83	16.84	16.84	16.80	16.88	16.87	16.86	16.88	16.87	16.88
Motor Gasoline	19.41	19.41	19.42	19.43	19.45	19.38	19.36	19.35	19.36	19.36
Jet Fuel	19.40	19.40	19.39	19.37	19.35	19.34	19.33	19.33	19.33	19.33
MoGas Blend Components	19.41	19.41	19.42	19.43	19.45	19.38	19.36	19.35	19.36	19.36
Misc. Products	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19
Unfinished Oils	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19
Crude Oil	20.16	20.18	20.22	20.22	20.21	20.23	20.25	20.24	20.24	20.19

Source: EIA (2000c)

Table A-15: Electricity Consumption by End-Use Sector (Billion Kilowatt-Hours)

End-Use Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Residential	924	955	936	995	1,008	1,043	1,082	1,076	1,128	1,139
Commercial	839	856	851	886	914	954	981	1,027	1,068	1,072
Industrial	946	947	973	977	1,008	1,013	1,030	1,033	1,040	1,050
Transportation	4	4	4	4	4	4	4	4	4	4
U.S. Territories*	-	-	-	-	-	-	-	-	-	-
Total	**2,713**	**2,762**	**2,763**	**2,861**	**2,935**	**3,013**	**3,098**	**3,140**	**3,240**	**3,265**

*EIA electric utility fuel consumption data does not include the U.S. territories.

- Not applicable

Source: EIA (2000a)